1-1-1993

Test 1668: John Deere 7800 Powerquad Diesel 16-Speed

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NEBRASKA OECD TRACTOR TEST 1668—SUMMARY 135
JOHN DEERE 7800 POWRQUAD DIESEL
16 SPEED

Location of Test: Tractor Testing Laboratory, University of Nebraska, Lincoln, Nebraska 68583-0832

Dates of Test: May 19 to June 4, 1993

Manufacturer: John Deere Tractor Works, P.O. Box 270, Waterloo, Iowa 50704

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 53.9 **Specific gravity converted to 60°/60° F *(15°/15°C)*** 0.8357 **Fuel weight** 6.958 lbs/gal *(0.834 kg/l)* **Oil SAE** 15W-40 **API service classification** SG/CE **To motor** 4.321 gal *(16.355 l)* **Drained from motor** 3.951 gal *(14.958 l)* **Transmission and hydraulic lubricant** John Deere Hy-Gard fluid **Front axle lubricant** John Deere GL-5 Gear Lubricant **Total time engine was operated** 23.0 hours.

ENGINE: Make John Deere Diesel **Type** six cylinder vertical with turbocharger **Serial No.** *RG6076T510807* **Crankshaft** lengthwise **Rated engine speed** 2100 **Bore and stroke** (as specified) 4.56″ × 4.75″ *(115.8 mm × 120.7 mm)* **Compression ratio** 15.5 to 1 **Displacement** 466 cu in *(7627 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** one paper element and prestrainer **Fuel cooler** radiator for inlet fuel **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** two thermostats and variable speed fan

ENGINE OPERATING PARAMETERS: Fuel rate: 59.3-63.3 lb/h *(26.9-28.7 kg/h)* **High idle:** 2225-2325 rpm **Turbo boost** nominal 14.5-18.1 psi *(100-125 kPa)* as measured 15.0 psi *(103 kPa)*

CHASSIS: Type front wheel assist **Serial No.** *RW7800H-003219* **Tread width** rear 59.8″ *(1518 mm)* to 108.3" *(2752 mm)* front 60.0″ *(1524 mm)* to 88.0″ *(2235 mm)* **Wheel base** 110.2″ *(2800 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial (4) range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 1.50 *(2.41)* second 1.81 *(2.91)* third 2.16 *(3.48)* fourth 2.65 *(4.26)* fifth 3.18 *(5.11)* sixth 3.83 *(6.16)* seventh 4.58 *(7.37)* eighth 5.05 *(8.13)* ninth 5.61 *(9.03)* tenth 6.09 *(9.80)* eleventh 7.29 *(11.73)* twelfth 8.93 *(14.37)* thirteenth 10.64 *(17.12)* fourteenth 12.82 *(20.63)* fifteenth 15.34 *(24.68)* sixteenth 18.80 *(30.25)* reverse 1.78 *(2.86)*, 2.14 *(3.45)*, 2.56 *(4.12)*, 3.14 *(5.05)*, 3.77 *(6.06)*, 4.54 *(7.31)*, 5.43 *(8.74)*, 5.99 *(9.64)*, 6.66 *(10.71)*, 7.23 *(11.63)*, 8.64 *(13.91)*, 10.59 *(17.04)* **Clutch** multiple wet disc hydraulically actuated by foot pedal **Brakes** wet multiple disc hydraulically actuated by two foot pedals which can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 2072 engine rpm and 1000 rpm at 2086 engine rpm **Unladen tractor mass** 15102 lb *(6850 kg)*

POWER TAKE-OFF PERFORMANCE

Power HP (kW)	Crank shaft speed rpm	Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1007 rpm)					
147.08 *(109.68)*	2101	8.77 *(33.20)*	0.415 *(0.252)*	16.77 *(3.30)*	
Maximum Power (2 hours)					
158.83 *(118.43)*	1696	9.03 *(34.17)*	0.395 *(0.241)*	17.60 *(3.47)*	
VARYING POWER AND FUEL CONSUMPTION					
147.08 *(109.68)*	2101	8.77 *(33.20)*	0.415 *(0.252)*	16.77 *(3.30)*	Air temperature
128.99 *(96.19)*	2166	7.85 *(29.70)*	0.423 *(0.257)*	16.44 *(3.24)*	76°F *(25°C)*
98.75 *(73.64)*	2207	6.64 *(25.13)*	0.468 *(0.285)*	14.87 *(2.93)*	Relative humidity
67.22 *(50.13)*	2248	5.35 *(20.24)*	0.553 *(0.337)*	12.57 *(2.48)*	50%
33.53 *(25.00)*	2260	3.88 *(14.69)*	0.805 *(0.490)*	8.64 *(1.70)*	Barometer
1.05 *(0.78)*	2296	2.59 *(9.79)*	17.176 *(10.448)*	0.41 *(0.08)*	28.95″ Hg *(98.04 kPa)*

Maximum Torque 515 lb.-ft. *(699 Nm)* at 1299 rpm
Maximum Torque Rise 40.2%
Torque rise at 1701 engine rpm 33.2%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F (°C) cool-ing med	Temp.°F (°C) Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—7th (B3) Gear									
131.99 *(98.43)*	11124 *(49.48)*	4.45 *(7.16)*	2098	4.50	0.461 *(0.280)*	15.09 *(2.97)*	196 *(91)*	63 *(17)*	29.15 *(98.71)*
75% of Pull at Maximum Power—7th (B3) Gear									
103.93 *(77.50)*	8325 *(37.03)*	4.68 *(7.53)*	2175	3.07	0.490 *(0.298)*	14.19 *(2.79)*	195 *(90)*	67 *(19)*	29.16 *(98.75)*
50% of Pull at Maximum Power—7th (B3) Gear									
71.44 *(53.27)*	5551 *(24.69)*	4.83 *(7.77)*	2216	2.03	0.565 *(0.344)*	12.31 *(2.42)*	189 *(87)*	67 *(19)*	29.16 *(98.75)*
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
103.93 *(77.50)*	8323 *(37.02)*	4.68 *(7.54)*	1637	3.15	0.446 *(0.271)*	15.61 *(3.07)*	198 *(92)*	67 *(19)*	29.16 *(98.75)*
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
71.44 *(53.27)*	5555 *(24.71)*	4.82 *(7.76)*	1667	2.03	0.488 *(0.297)*	14.27 *(2.81)*	184 *(84)*	67 *(19)*	29.16 *(98.75)*

DRAWBAR PERFORMANCE
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool-ing med	Air dry bulb	Barom. inch Hg (kPa)
				5th (B1) Gear					
111.72 (83.31)	14755 (65.63)	2.84 (4.57)	2151	14.34	0.529 (0.322)	13.16 (2.59)	190 (88)	62 (17)	29.15 (98.71)
				6th (B2) Gear					
129.82 (96.81)	14037 (62.44)	3.47 (5.58)	2048	8.79	0.474 (0.288)	14.68 (2.89)	198 (92)	62 (17)	29.15 (98.71)
				7th (B3) Gear					
138.34 (103.16)	13183 (58.64)	3.94 (6.34)	1909	7.24	0.451 (0.274)	15.44 (3.04)	204 (95)	63 (17)	29.16 (98.75)
				8th (C1) Gear					
140.56 (104.81)	12386 (55.10)	4.26 (6.85)	1845	5.89	0.443 (0.269)	15.71 (3.10)	204 (96)	64 (18)	29.17 (98.78)
				9th (B4) Gear					
141.37 (105.42)	11586 (51.53)	4.58 (7.37)	1775	5.16	0.441 (0.268)	15.78 (3.11)	208 (98)	64 (18)	29.17 (98.78)
				10th (C2) Gear					
142.73 (106.44)	11183 (49.74)	4.79 (7.70)	1706	4.75	0.436 (0.265)	15.98 (3.15)	207 (97)	65 (18)	29.17 (98.78)
				11th (C3) Gear					
142.43 (106.21)	9215 (40.99)	5.80 (9.33)	1701	3.58	0.438 (0.267)	15.87 (3.13)	204 (96)	66 (19)	29.17 (98.78)
				12th (C4) Gear					
141.21 (105.30)	7395 (32.89)	7.16 (11.52)	1699	2.81	0.445 (0.270)	15.65 (3.08)	209 (98)	67 (19)	29.16 (98.75)
				13th (D1) Gear					
139.25 (103.84)	6185 (27.51)	8.44 (13.59)	1698	2.29	0.448 (0.273)	15.52 (3.06)	208 (98)	68 (20)	29.16 (98.75)

DRAWBAR PERFORMANCE (BALLASTED)
MAXIMUM POWER IN SELECTED GEARS

Power Hp (kW)	Drawbar pull lbs (kN)	Speed mph (km/h)	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr (kg/kW.h)	Hp.hr/gal (kW.h/l)	Temp.°F (°C) cool-ing med	Air dry bulb	Barom. inch Hg (kPa)
				4th (A4) Gear					
117.47 (87.60)	19052 (84.75)	2.31 (3.72)	2103	14.19	0.519 (0.315)	13.42 (2.64)	195 (91)	59 (15)	28.76 (97.39)
				5th (B1) Gear					
134.87 (100.57)	17881 (79.54)	2.83 (4.55)	1976	7.00	0.461 (0.280)	15.11 (2.98)	198 (92)	60 (16)	28.76 (97.39)
				6th (B2) Gear					
140.76 (104.97)	17126 (76.18)	3.08 (4.96)	1768	6.05	0.445 (0.271)	15.63 (3.08)	208 (98)	60 (16)	28.76 (97.39)
				7th (B3) Gear					
143.81 (107.24)	14863 (66.11)	3.63 (5.84)	1699	3.83	0.436 (0.265)	15.97 (3.15)	207 (97)	58 (14)	28.75 (97.36)
				8th (C1) Gear					
144.61 (107.84)	13438 (59.78)	4.04 (6.49)	1701	3.06	0.433 (0.264)	16.06 (3.16)	207 (97)	55 (13)	28.79 (97.49)
				9th (B4) Gear					
144.25 (107.57)	12038 (53.55)	4.49 (7.23)	1701	2.89	0.436 (0.265)	15.96 (3.14)	207 (97)	58 (14)	28.76 (97.39)
				10th (C2) Gear					
143.87 (107.29)	11064 (49.21)	4.88 (7.85)	1696	2.63	0.435 (0.265)	16.00 (3.15)	206 (96)	55 (13)	28.78 (97.46)
				11th (C3) Gear					
144.08 (107.44)	9184 (40.85)	5.88 (9.47)	1701	2.03	0.436 (0.265)	15.98 (3.15)	207 (97)	56 (13)	28.77 (97.43)
				12th (C4) Gear					
141.76 (105.71)	7350 (32.69)	7.23 (11.64)	1700	1.59	0.442 (0.269)	15.75 (3.10)	204 (96)	57 (14)	28.76 (97.39)
				13th (D1) Gear					
138.87 (103.55)	6118 (27.21)	8.51 (13.70)	1700	1.41	0.453 (0.276)	15.36 (3.03)	208 (98)	58 (14)	28.75 (97.36)

REPAIRS AND ADJUSTMENTS: No repairs or adjustments

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature at the injection pump return was maintained at 125° F *(52°C)*. The performance results on this summary were taken from OECD tests conducted under the Code II Restricted Standard Test Code procedure.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1668**, Summary 135, July 6, 1993.

LOUIS I. LEVITICUS
Engineer-in-Charge

L.L. BASHFORD
R.D. GRISSO
K. VON BARGEN
Board of Tractor Test Engineers

DRAWBAR PERFORMANCE (FRONT DRIVE DISENGAGED)
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F (°C) cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—7th (B3) Gear									
134.25 *(100.11)*	11133 *(49.52)*	4.52 *(7.28)*	2100	2.76	0.455 *(0.277)*	15.28 *(3.01)*	200 *(93)*	58 *(14)*	28.75 *(97.36)*
75% of Pull at Maximum Power—7th (B3) Gear									
104.59 *(77.99)*	8339 *(37.09)*	4.70 *(7.57)*	2170	2.07	0.490 *(0.298)*	14.19 *(2.80)*	193 *(89)*	61 *(16)*	28.75 *(97.36)*
50% of Pull at Maximum Power—7th (B3) Gear									
71.64 *(53.42)*	5563 *(24.75)*	4.83 *(7.77)*	2213	1.45	0.568 *(0.346)*	12.24 *(2.41)*	187 *(86)*	61 *(16)*	28.75 *(97.36)*
75% of Pull at Reduced Engine Speed—10th (C2) Gear									
104.59 *(78.00)*	8320 *(37.01)*	4.71 *(7.59)*	1637	2.15	0.444 *(0.270)*	15.66 *(3.08)*	195 *(90)*	61 *(16)*	28.75 *(97.36)*
50% of Pull at Reduced Engine Speed—10th (C2) Gear									
71.60 *(53.39)*	5565 *(24.75)*	4.82 *(7.76)*	1664	1.54	0.488 *(0.297)*	14.26 *(2.81)*	187 *(86)*	61 *(16)*	28.75 *(97.36)*

DRAWBAR PERFORMANCE (FRONT DRIVE DISENGAGED)
MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F (°C) cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
4th (A4) Gear									
106.63 *(79.51)*	17019 *(75.70)*	2.35 *(3.78)*	2144	14.40	0.536 *(0.327)*	12.97 *(2.56)*	189 *(87)*	60 *(16)*	28.76 *(97.39)*
5th (B1) Gear									
129.08 *(96.25)*	16004 *(71.19)*	3.02 *(4.87)*	2100	6.16	0.471 *(0.287)*	14.76 *(2.91)*	196 *(91)*	60 *(16)*	28.76 *(97.39)*
6th (B2) Gear									
131.59 *(98.13)*	13228 *(58.84)*	3.73 *(6.00)*	2099	3.86	0.460 *(0.280)*	15.14 *(2.98)*	204 *(95)*	60 *(16)*	28.76 *(97.39)*
7th (B3) Gear									
134.25 *(100.11)*	11133 *(49.52)*	4.52 *(7.28)*	2100	2.76	0.455 *(0.277)*	15.28 *(3.01)*	200 *(93)*	58 *(14)*	28.75 *(97.36)*
8th (C1) Gear									
132.75 *(98.99)*	9943 *(44.23)*	5.01 *(8.06)*	2099	2.41	0.460 *(0.280)*	15.13 *(2.98)*	199 *(93)*	55 *(13)*	28.79 *(97.49)*
9th (B4) Gear									
130.91 *(97.62)*	8812 *(39.20)*	5.57 *(8.97)*	2100	2.15	0.465 *(0.283)*	14.96 *(2.95)*	203 *(95)*	59 *(15)*	28.76 *(97.39)*
10th (C2) Gear									
131.76 *(98.25)*	8152 *(36.26)*	6.06 *(9.76)*	2102	1.98	0.462 *(0.281)*	15.08 *(2.97)*	201 *(94)*	56 *(13)*	28.78 *(97.46)*
11th (C3) Gear									
131.10 *(97.76)*	6765 *(30.09)*	7.27 *(11.70)*	2098	1.54	0.465 *(0.283)*	14.95 *(2.95)*	198 *(92)*	57 *(14)*	28.77 *(97.43)*
12th (C4) Gear									
126.32 *(94.19)*	5295 *(23.55)*	8.95 *(14.40)*	2101	1.36	0.479 *(0.291)*	14.54 *(2.86)*	201 *(94)*	58 *(14)*	28.76 *(97.39)*

TRACTOR SOUND LEVEL WITH CAB	**Front Wheel Drive Disengaged dB(A)**	**Engaged dB(A)**
Gear closest to 4.7 mph *(7.5 km/h)* 7th (B3) Gear	71.5	71.5
Maximum sound level	71.5	71.5
Transport speed 16th (D4) Gear	73.5	—
Bystander 16th (D4) Gear	86.0	—

TIRES, BALLAST AND WEIGHT	**With Ballast**	**Without Ballast**
Rear Tires —No., size, ply & psi *(kPa)*	Four 18.4R42; **; 12 *(85)*	Two 18.4R42; **; 16 *(110)*
Ballast —Duals (total)	1670 lb *(757 kg)*	None
—Cast Iron (total)	2000 lb *(907 kg)*	None
Front Tires —No., size, ply & psi *(kPa)*	Two 14.9R30; ***; 23 *(160)*	Two 14.9R30; ***, 23 *(160)*
Ballast —Liquid (total)	None	None
—Cast Iron (total)	None	None
Height of Drawbar	22.5 in *(570 mm)*	21.5 in *(545 mm)*
Static Weight with Operator—Rear	13640 lb *(6187 kg)*	9980 lb *(4527 kg)*
—Front	5268 lb *(2390 kg)*	5286 lb *(2398 kg)*
—Total	18908 lb *(8577 kg)*	15266 lb *(6925 kg)*

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III
Quick Attach: Walterscheid lower link ends

Maximum Force Exerted Through Whole Range:	10161 lbs	*(45.2 kN)*
i) Opening pressure of relief valve:	NA	
Sustained pressure with pump stalled:	2880 psi	*(198 bar)*
ii) Pump delivery rate at minimum pressure:	26.0 GPM	*(98.4 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	23.8 GPM	*(90.1 l/min)*
Delivery pressure:	2570 psi	*(177 bar)*
Power:	35.7 HP	*(26.6 kW)*

THREE POINT HITCH PERFORMANCE (SAE Static Test)

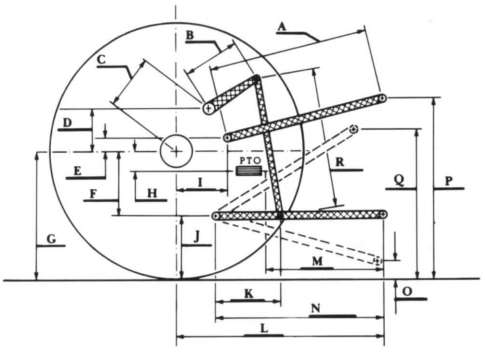
Observed Maximum Pressure psi. *(bar)*	2880 *(198)*
Location	remote outlet
Hydraulic oil temperature °F *(°C)*	144 *(62)*
Location	hydraulic sump
Category	IIIN
Quick attach	No

With lift cylinders—1 × 70 mm and 1 × 80 mm

Hitch point distance to ground level	8.1 *(206)*	16.0 *(406)*	24.0 *(610)*	32.0 *(813)*	40.0 *(1016)*
Lift force on frame lb	11959	11949	11605	10760	9168
Lift force on frame *(kN)*	*(53.2)*	*(53.2)*	*(51.6)*	*(47.9)*	*(40.8)*

With lift cylinders—2 × 80 mm

Hitch point distance to ground level in. *(mm)*	7.7 *(196)*	16.0 *(406)*	24.0 *(610)*	32.0 *(813)*	40.0 *(1016)*
Lift force on frame lb.	13295	13718	13295	12303	10426
Lift force on frame *(kN)*	*(59.1)*	*(61.0)*	*(59.1)*	*(54.7)*	*(46.4)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	*mm*	inch	*mm*
A	27.2	*692*	26.6	*676*
B	14.8	*375*	14.8	*375*
C	24.5	*623*	24.5	*623*
D	23.1	*588*	23.1	*588*
E	11.1	*283*	7.5	*190*
F	10.8	*275*	10.8	*275*
G	35.6	*905*	34.3	*870*
H	4.1	*105*	4.1	*105*
I	19.8	*504*	19.8	*504*
J	24.8	*630*	23.4	*595*
K	24.1	*612*	23.1	*587*
L	47.5	*1206*	46.4	*1179*
M	23.1	*586*	22.0	*559*
N	39.8	*1011*	38.7	*984*
O	9.0	*229*	8.0	*203*
P	51.8	*1315*	45.4	*1153*
Q	38.8	*984*	36.8	*933*
R	38.1	*968*	35.9	*911*

JOHN DEERE 7800 POWRQUAD DIESEL

Agricultural Research Division
Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln
Darrell Nelson, Dean and Director